

Weekly Math Homework Packet 03-10 to 03-17

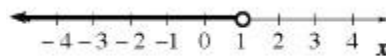
Please have this homework sheet out next to your homework at the beginning of the period.

Homework Effort Score				Assign Date	Due Date	Section	Classwork	Homework
100%	75%	50%	Missing					
				Mon 3/10	Tues 3/11	6.1.4	6-25, 6-26, 6-35, 6-42, 6-43	6-44 to 6-47
				Tues 3/11	Wed 3/12	6.2.1	6-48 to 6-50	6-54 to 6-58
				Wed 3/12	Fri 3/14	6.2.2	6-60 to 6-64	6-65 to 6-70
				Fri 3/14	Mon 3/17	6.2.3	6-71 to 6-75	6-81 to 6-86

Remember – Homework help available at www.cpm.org

Monday Classwork

- 6-35.** Jerry and Ken were working on solving the inequality $3x - 1 \leq 2x$. They found the boundary point and Ken made the number line graph shown below.



- Jerry noticed a problem. *“Doesn’t the line at the bottom of the \leq symbol mean that it includes the equal part? That means that $x = 1$ is also a solution. How could we show that?”*
- “Hmmm,”* Jerry said. *“Well, the solution $x = 1$ would look like this on a number line. Is there a way that we can combine the two number lines?”*



- Discuss this idea with your team and be prepared to share your ideas with the class.

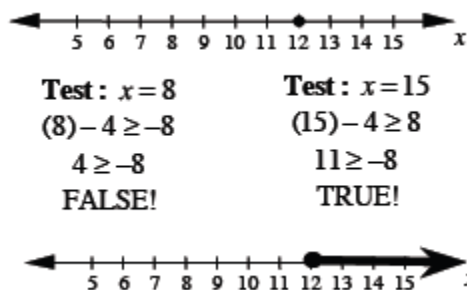


METHODS AND MEANINGS

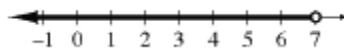
MATH NOTES

Graphing Inequalities

- To solve and graph an inequality with one variable, first treat the problem as if it were an equality and solve the problem. The solution to the equality is called the **boundary point**. For example, to solve $x - 4 \geq 8$, first solve $x - 4 = 8$. The solution $x = 12$ is the boundary point for the inequality $x - 4 \geq 8$.



- Since the original inequality is true when $x = 12$, place your boundary point on the number line as a solid point. Then test one value on either side in the *original* inequality by substituting it into the original inequality. This will determine which set of numbers makes the inequality true. Write the inequality solution and extend an arrow onto the number line in the direction of the side that makes the inequality true. This is shown with the examples of $x = 8$ and $x = 15$ above. Therefore, the solution is $x \geq 12$ (also shown on the number line).
- When the inequality is $<$ or $>$, the boundary point is *not* included in the answer. On a number line, this would be indicated with an open circle at the boundary point. For example, the graph of $x < 7$ is shown below.



- 6-42.** Solve each of the following inequalities. Represent the solutions algebraically (with symbols) and graphically (on a number line).
 - $3x - 3 < 2 - 2x$
 - $\frac{4}{5}x \geq 8$

- **6-43.** Determine if each of the numbers below is a solution to the inequality $3x - 2 < 2 - 2x$. Show all of your work.
 - a. 2
 - b. $\frac{1}{2}$
 - c. -3
 - d. $\frac{2}{3}$

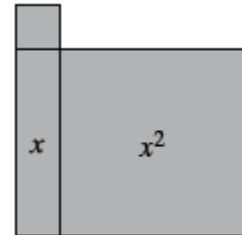
Monday Homework

- **6-44.** Evaluate the expressions below using $x = -2$, $y = -5$, and $z = 3$.
 - a. xyz
 - b. $3(x + y)$
 - c. $\frac{z+2}{y} + 1$
- **6-45.** Write an expression for the perimeter, and then find the perimeter for each of the given values of x .

a. $P =$

b. $x = 7 \text{ cm}$

c. $x = 5.5 \text{ cm}$



- **6-47.** Beth is filling a small backyard pool with a garden hose. The pool holds 30 gallons of water. After 5 minutes, the pool is about one-fourth full.



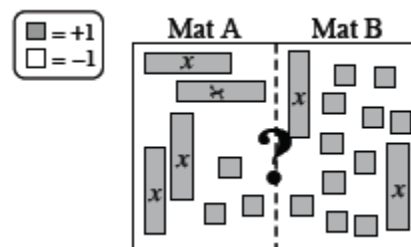
- a. About how long will it take to fill the pool?
- b. Assuming that the water is flowing at a constant rate, about how much water is going into the pool each minute?

• **6-48. CHOOSING A PRICE PLAN**

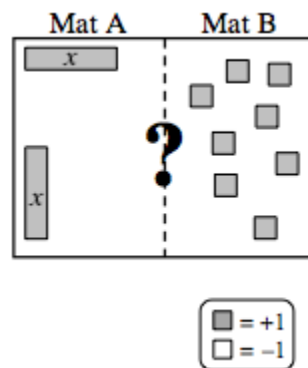
- Sandeep works at a bowling alley that currently charges players \$3 to rent shoes and \$4 per game. However, his boss is thinking about charging \$11 to rent shoes and \$2 per game.
 - If a customer rents shoes and plays two games, will he or she pay more with the current price plan or the new price plan? Show how you know.
 - If the customer bowls 7 games, which price plan is cheaper?

• **6-49. WILL THEY EVER BE EQUAL?**

- Sandeep decided to represent the two price plans from problem 6-48 with the expressions below, where x represents the number of games bowled. Then he placed them on the Expression Comparison Mat shown at right.



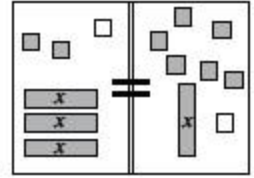
- Original price: $4x + 3$ New price: $2x + 11$
 - Sandeep then simplified the expressions on the mat. What steps did Sandeep take to simplify the mat to this point?
 - Sandeep noticed that for a certain number of games, customers would pay the same amount either way. He found a value of x that will make $4x + 3 = 2x + 11$. How many games would that customer bowl?



- What was the price he paid? Explain.

- **6-50. SOLVING FOR x**

- When the expressions on each side of the comparison mat are equal, they can be represented on a mat called an **Equation Mat**. Obtain a [Lesson 6.2.1 Resource Page](#) and algebra tiles from your teacher. Now the “=” symbol on the central line indicates that the expressions on each side of the mat are equal.

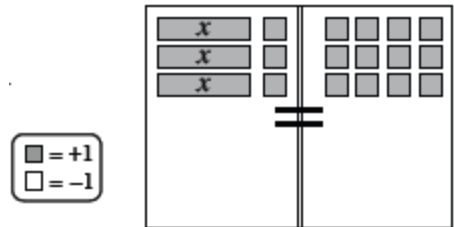


- Build the equation represented by the Equation Mat at right on your own mat using [algebra tiles](#).

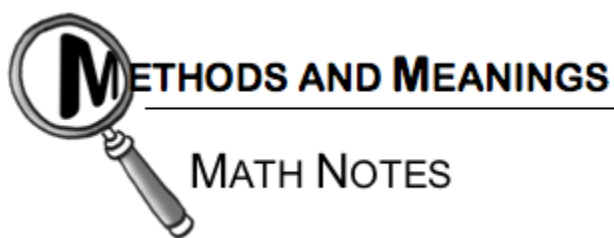
- On your paper, record the original equation represented on your Equation Mat.
- Simplify the tiles on the mat as much as possible. Record what is on the mat after each legal move as you simplify each expression. What value of x will make the expressions equal?

Tuesday Homework:

- **6-54.** Consider the Equation Mat at right.

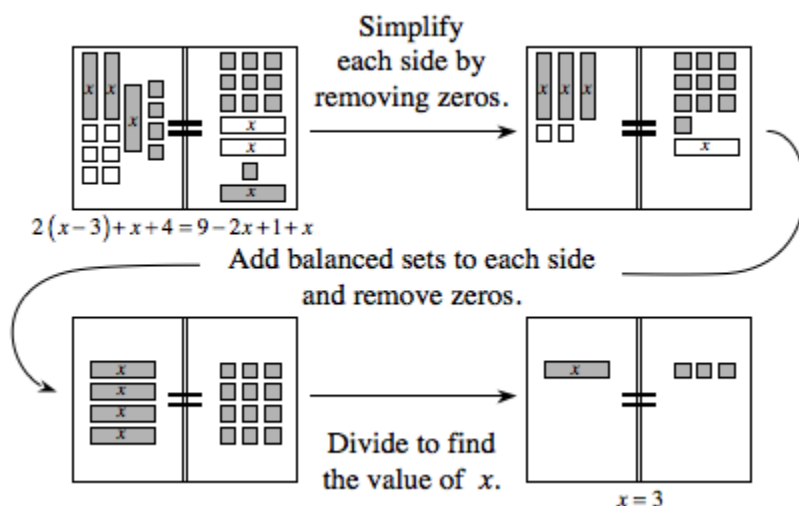


- Write the original equation represented.
 - Simplify the tiles on the mat as much as possible. What value of x will make the two expressions equal?
- **6-55.** When Lakeesha solved the equation $3(x + 1) = 12$ from problem 6-54, she reasoned this way:
 - “Since 3 groups of $(x + 1)$ equals 3 groups of 4, then I know that each group of $(x + 1)$ must equal 4.”
- Do you agree with her reasoning? Explain.
 - How can the result of Lakeesha’s reasoning be written?
 - Verify that your answer from problem 6-54 will make the equation you wrote in part (b) true.



Using an Equation Mat

- An **Equation Mat** can help you visually represent an equation with algebra tiles. It can also help you find the solution to an equation.
- For example, the equation $2(x - 3) + x + 4 = 9 - 2x + 1 + x$ can be represented as shown on the first Equation Mat below. Then it can be solved using simplification steps (also known as legal moves) to show that the solution is $x = 3$.



- 6-56.** In problems 6-54 and 6-55, $3(x + 1)$ could also be written as $3x + 3$ by using the Distributive Property. The expression $3(x + 1)$ is a product, while $3x + 3$ is a sum. For each expression below, write an equivalent expression that is a product instead of a sum. This process of writing an expression in the form of factors (multiplication) is called **factoring**.

a. $75x - 50 = 25(\quad)$

b. $32x^2 + 48x = 16(\quad)$

c. $-40m - 30 = 10(\quad)$

d. $63m^2 - 54ml = 9(\quad)$

- **6-57.** Evaluate the expression $5 + (-3x)$ for the given x -values.
 - a. $x = 3$
 - b. $x = \frac{1}{3}$
 - c. $x = -3$
- **6-58.** Which fractions below are equivalent? Explain how you know.
 - a. $\frac{20}{5}$
 - b. $\frac{-20}{5}$
 - c. $\frac{20}{-5}$
 - d. $\frac{-20}{-5}$
 - e. $-\frac{20}{5}$

Wednesday classwork:

- **6-60.** Chen's sister made this riddle for him to solve: *"I am thinking of a number. If you add two to the number then triple it, you get nine."*
 - a. Build the equation on an Equation Mat using [algebra tiles](#). What are two ways that Chen could write this equation?
 - b. Solve the equation and show your work by writing the equation on your paper after each legal move.
 - c. When Chen told his sister the mystery number in the riddle, she said he was wrong. Chen was sure that he had figured out the correct number. Find a way to justify that you have the correct solution in part (b).
- **6-61.** Now solve the equation $4(x + 3) = 8$. Remember to:
 - Build the equation on your Equation Mat with [algebra tiles](#).
 - Simplify the equation using your legal moves.
 - Record your work on your paper.
 - Solve for x . That is, find the value of x that makes the equation true.



• **6-62. CHECKING YOUR SOLUTION**

- When you solve an equation that has one solution, you get a value for the variable. But how do you know that you have done the steps correctly and that your answer “works”?
 - Look at your answer for problem 6-61. How could you verify that your solution is correct and convince someone else? Discuss your ideas with your team.
 - a. When Kelly and Madison compared their solutions for the equation $2x - 7 = -2x + 1$, Kelly got a solution of $x = 2$ and Madison got a solution of $x = -1$. To decide if the solutions were correct, the girls decided to check their answers to see if they made the expressions equal.

Finish their work below to determine if either girl has the correct solution.

<i>Kelly's Work</i>	<i>Madison's Work</i>
$2x - 7 \stackrel{?}{=} -2x + 1$	$2x - 7 \stackrel{?}{=} -2x + 1$
$2(2) - 7 \stackrel{?}{=} -2(2) + 1$	$2(-1) - 7 \stackrel{?}{=} -2(-1) + 1$

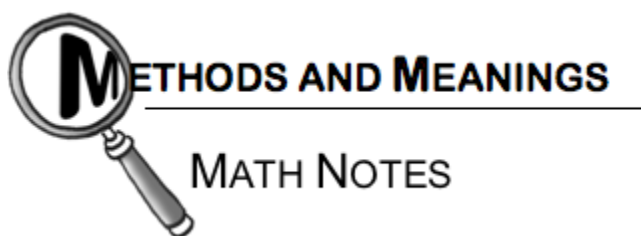
- b. When checking, Kelly ended up with $-3 = -3$. Does this mean that her answer is correct or incorrect? And if it is correct, does this mean the solution is $x = -3$ or $x = 2$? Explain.
- c. Go back to problem 6-61 and show how to check your solution for that problem.
- **6-63.** Kelly solved the equation $4(x + 3) = 8$ from problem 6-61. Her work is shown at right.

$$\begin{aligned}
 4(x + 3) &= 8 \\
 x + 3 &= 2 \\
 x + 3 + (-3) &= 2 + (-3) \\
 x &= -1
 \end{aligned}$$

- a. If $4(x + 3) = 8$, does $x + 3$ have to equal 2? Why?
- b. What did Kelly do to remove the 3 unit tiles from the left side of the equation? Does this move affect the equality?
- c. If Kelly were solving the equation $3(x - 5) = 9$, what might her first step be? What would she have after that step? You may want to build this equation on an Equation Mat to help make sense of her strategy.

- **6-64.** Now practice this new solving skill by building each of the equations below with [algebra tiles](#), solving for x , and checking your solution for each equation. Record your work.

$4(x + 1) + 1 + (-x) = 10 + x$	$-1 + 2x - x = x - 8 + (-x)$	$5 + 2(x - 4) = 4x + 7$	$9 - 3x = 1 + x$



Equations and Inequalities

- **Equations** always have an equal sign. **Inequalities** have one of inequality symbols defined in the Lesson 6.1.1 Math Note. To **solve** an equation or inequality means to find all values of the variable that make the relationship true. The solution can be shown on a number line. See the examples below.

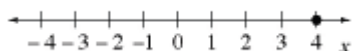
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Solve this equation:

$$x + 3 = 7$$

The solution is:

$$x = 4$$

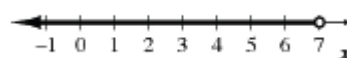


Solve this inequality:

$$x - 2 < 5$$

The solution is:

$$x < 7$$



- **Wednesday Homework**

- **6-65.** Substitute the given solution into the corresponding equation to check it. Then decide if the solution is **correct or incorrect**.



a. $5x + 8 = 3x - 2$

Solution: $x = -5$

b. $2(x + 1) + 6 = 20 - 3x$

Solution: $x = 4$

-
- **6-66.** During this chapter, you will use your new solving skills to solve word problems. Think about and use the strategies you already have to answer the questions below.

- a. Andy is 4 years older than Eduardo. If Andy is x years old, write an expression to represent Eduardo's age.

- b. In Eduardo's collection, the number of butterflies is 12 more than twice the number of moths. If there are x moths, write an expression to represent the number of butterflies he has.



- **6-67.** Evaluate the expressions $3x - 2$ and $4x + 4$ for the following values of x . When you have found the value for each expression, write a statement using $<$, $>$, or $=$ that shows how the two values are related.

. $x = 0$

a. $x = -6$

b. $x = 5$

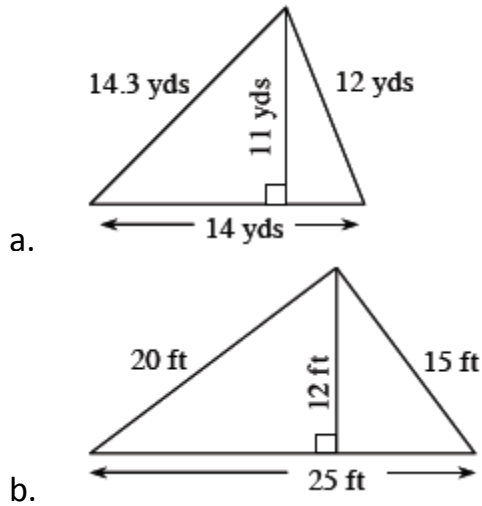
c. $x = -2$

- **6-68.** Victor wants to play "Guess My Number." Use the clues below to figure out his number. Each part is a new game. [Help \(Html5\)](#) ⇌ [Help \(Java\)](#)

- a. *"When you double my number and subtract 9, you get my original number. What is my number?"*

- b. *"When you double my number and add 5, you get 17. What is my number?"*

- **6-69.** Find the **perimeter** and **area** of each triangle below.



- **6-70.** To solve the following problem, use the 5-D Process. Define a variable and write an expression for each column of your table.
- In the first three football games of the season, Carlos gained three times as many yards as Alston. Travis gained ten yards more than Carlos. Altogether, the three players gained a total of 430 yards. How many yards did Carlos gain?



<u>Draw / Describe:</u>					
<u>Define:</u>				<u>Do:</u>	<u>Decide:</u>
Trial 1					
Trial 2					
Trial 3					
<u>Declare:</u>					

- **Friday Classwork**

- **6-71.** Gene and Aidan were using algebra tiles to solve equations. Aidan was called away.
- Help Gene finish by completing the table shown below

Mat A	Mat B	Steps taken
$2x + 2(2x + 1) + (-3x) + (-6)$	$4x + 3 + (-3) + x + 8$	Original Equation
		1. Use the Distributive Property.
$3x + (-4)$	$5x + 8$	2.
		3. Subtract $3x$ from both sides.
-12	$2x$	4.
		5. Divide both sides by 2.

-
- **6-72.** Aidan was frustrated that he needed to write so much when solving an equation. He decided to come up with a shortcut for recording his work to solve a new equation.
- As you look at Aidan's recording at right of how he solved $2x + 4 = -12$ below, visualize an Equation Mat with algebra tiles. Then answer the questions for each step below.
-

- What legal move does writing -4 twice represent?
- What legal move does circling the $+4$ and the -4 represent?
- What does the box around the $\frac{2}{2}$ represent?
- Why did Aidan divide both sides by 2?
- Check Aidan's solution in the original equation. Is his solution correct?

$$\begin{array}{r}
 2x + 4 = -12 \\
 \quad \quad \quad -4 = -4 \\
 \hline
 \boxed{\frac{2x}{2}} = \frac{-16}{2} \\
 x = -8
 \end{array}$$

- **6-73.** The method of recording the steps in the solution of an equation is useful only if you understand what operations are being used and how they relate to the legal moves on your Equation Mat.

Find the work shown at right

$$x + (-4) + 6x = 3x - 1 + 5$$

- a. For each step in the solution, add the missing work below each line that shows what legal moves were used. You may want to build the equation on an Equation Mat.

$$-4 + 7x = 3x + 4$$

$$7x = 3x + 8$$

- b. Check that the solution is correct.

$$4x = 8$$

$$x = 2$$

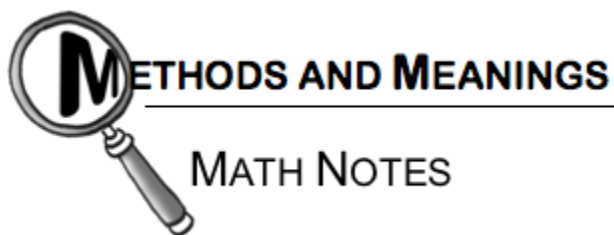
- **6-74.** For each equation below, solve for x . You may want to build the equation on your Equation Mat. Record your work in symbols using Aidan's method from problem 6-72. Remember to check your solution.

- a. $-2x + 5 + 2x - 5 = -1 + (-1) 6x + 2$

- b. $3(4 + x) = x + 6$

- **6-75.** Oliver is building a train depot for his model railroad. As his final step, he needs to apply rain gutters around the roof of the rectangular building. He has 52 cm of rain gutters. The length of the depot is 19 cm. Explore how Oliver can find the width of the depot by answering the questions below.
- Find the width of the depot using arithmetic (that is, solve the problem without using any variables). Record your steps. Use w to represent the width of the depot. Write an algebraic equation that shows the perimeter is 52 cm, and solve your equation. Record your steps.
 - a. Use w to represent the width of the depot. Write an algebraic equation that shows the perimeter is 52 cm, and solve your equation. Record your steps.
 - b. Which method, the arithmetic or algebraic, did you prefer? Why?

Friday Homework



Checking a Solution

- To check a solution to an equation, substitute the solution into the equation and verify that it makes the two sides of the equation equal.
- For example, to verify that $x = 10$ is a solution to the equation $3(x - 5) = 15$, substitute 10 into the equation for x and then verify that the two sides of the equation are equal.

$$\begin{array}{l} 3(10 - 5) \stackrel{?}{=} 15 \\ 3(5) \stackrel{?}{=} 15 \\ 15 = 15 \end{array} \quad \checkmark \quad \text{True, so } x = 10 \\ \text{is a solution.}$$

$$\begin{array}{l} 3(2 - 5) \stackrel{?}{=} 15 \\ 3(-3) \stackrel{?}{=} 15 \\ -9 \neq 15 \end{array} \quad \times \quad \text{Not true, so } x = 2 \\ \text{is not a solution.}$$

- As shown at right, $x = 10$ is a solution to the equation $3(x - 5) = 15$.
- What happens when you do this check if your answer is incorrect? For example, try substituting $x = 2$ into the same equation. The result shows that $x = 2$ is not a solution to this equation.
- **6-81.** Solve each equation below for x . Check your final answer. [Help \(Html5\)](#) \Leftrightarrow [Help \(Java\)](#)
 - a. $4x = 6x - 14$
 - b. $3x + 5 = 50$

- **6-82.** Forty percent of the students at Pinecrest Middle School have a school sweatshirt. There are 560 students at the school. Draw a diagram to help you solve each problem below.
 - . How many students have a school sweatshirt?
 - a. If 280 students have school t-shirts instead of sweatshirts, what percentage of the school has a t-shirt?
 - b. What percentage of the school does not have a t-shirt or a sweatshirt?
- **6-84.** Factor each expression. That is, write an equivalent expression that is a product instead of a sum by putting the greatest common factor out in front of parentheses
 - a. $20y - 84$
 - b. $24b^2 + 96b$
- **6-86.** A cattle rancher gave $\frac{1}{3}$ of his land to his son and kept the remaining $\frac{2}{3}$ for himself. He kept 34 acres of land. How much land did he have to begin with?